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THE PRECAUTIONARY APPROACH IN FISHERY MANAGEMENT

Working paper submitted by the delegation of Ukraine
for the Working Group on the precautionary approach
in fisheries management

1. The essence of the precautionary approach in fisheries management should, in the view of the delegation of Ukraine, be that under given conditions restrictions on fisheries are applied which reduce catches to a level known to be below the possible catch determined at some time for the species in question or similar species on the basis of generally accepted, standard regulatory measures. The extreme instance of the precautionary approach is the introduction of a moratorium on fishing.

2. The present working paper discusses the sphere of application of the precautionary approach solely on the basis of biology, ecology and the state of the stocks of the species fished. The administrative, economic or political reasons for its possible application are not addressed.

3. The precautionary approach in fisheries management should be applied in the following cases:

(a) When there is a need to begin exploitation of a new species in the absence of sufficient scientific data to permit its exploitation on the basis of normal fishery regulation measures;

(b) To recommence exploitation of species to which a fishing moratorium has been applied;

(c) In intensifying fishing of species which are being fished insufficiently intensively and regarding which, as a rule, insufficient scientific data on the reaction of the species to the impact of fishing are available;

(d) If changes take place in an exploited population which were not predicted by the models used and which arise as a result of the joint impact of long-term natural cycles and fishing;

(e) When there is a need to replenish populations whose numbers have been depleted as a result of over-fishing based on the use of models inappropriate to the given situation, the use of erroneous models or the absence of regulation.

4. Application of the precautionary approach to the management of fishing for a given species should in our view be temporary in nature and should be accompanied by intensive fisheries research on the basis of which reliable information to permit a transition to a more intensive level of exploitation can be obtained.

5. If data on the size of the stock and of the possible catch are imprecise or lacking, experimental fishing is organized at a catch level known to be well below the possible catch determined at some time for the species in question or similar species on the basis of generally accepted, standard regulatory measures for that or similar species in other regions.

6. Once the necessary biological information has been obtained confirming the possibility of more extensive exploitation of living resources to which the precautionary approach had been applied, they should be fished on the basis of the scaled-down fisheries regime.

7. The scaled-down fisheries regime is based on utilization of criteria which would establish the size of the recommended catch at a level which protects the stock against possible over-fishing. One of the criteria of this kind which make it possible artificially to reduce the estimates obtained on the basis of the MSY concept and hence to arrive at the scaled-down fishing regime is the $F_{0.1}$ criterion (Gulland, Boerema, 1973). At present, in our view, bearing in mind the possibility of compiling information, its accessibility and its reliability, methods for the conservation and rational utilization of resources should be based on the MSY concept refined by means of the $F_{0.1}$ criterion.

8. One example of the use of the $F_{0.1}$ criterion to organize a scaled-down fishery regime in the Antarctic was its use to calculate the possible catch of a population of Antarctic silverfish (pleurogramma antarcticum). Comprehensive studies of silverfish biology carried out by YugNIRO in Prydz Bay from 1978 to 1989 demonstrated the species' high fisheries potential. The effective maximum sustainable yield per recruit (MSY/R) for a specified age at first capture was calculated on the basis of the Beverton-Holt analytical model. Taking a cautious approach to the exploitation of a new species in a region that had not been extensively studied, and given the important role of the silverfish in the food chain, an estimate of future fishing mortality obtained with the help of

the $F_{0.1}$ criterion was used to organize the fishery regime, and the optimum exploitation coefficient $U_{opt.}$ was determined by Baranov's equation.

9. As a result of its extremely low position in the food chain and, consequently, extremely high natural mortality, which is uncharacteristic of most Antarctic fish, the silverfish is a species for which determination of length and age for the start of optimum exploitation by the Kutty and Qasim equation (Kutty, Qasim, 1968) gives low figures, so that practically the entire silverfish stock in question is fishable. With this in mind, a figure corresponding to the number of fish older than the age at which 50 per cent of the fish become sexually mature was taken as the fishable stock. Thus the fishable stock and allowable harvest calculated on the basis of the optimum exploitation coefficient were even lower than the harvest determined solely on the basis of the $F_{0.1}$ criterion, and this is fully in line with the approaches to conservation specified in article 3, paragraph 2, of the 1991 Madrid Protocol on Environmental Protection signed by the Antarctic Treaty Consultative Parties.

10. In practice, no fishing for silverfish took place, but this approach to planning the exploitation of silverfish resources on the basis of a preliminary cycle of investigations is to our mind an example of a cautious approach to calculating the possible catch of fishery species in the Antarctic.

11. In the future, bearing in mind the growing intensification of international fisheries and their extension to new and previously unfished species, further improvement of the initial information determining the optimum exploitation regime for targeted species is unavoidable. Relevant studies will include in-depth investigation of the amplitude and periodicity of long-term variations in stocks caused by factors other than fishing (for example, anomalous environmental phenomena), and investigation of the biology of associated and accompanying species. This would entail a transition to investigation of marine biotic communities on the ecosystem level. Such investigations must be based on study and quantitative modelling of interactions of the combined population of fish and other aquatic organisms with the environment.

12. At present most marine research centres involved with the regulation of fisheries acknowledge that in the near future marine ecosystem modelling which pays particular attention to fish and other fishery species will be a powerful new means of regulating fisheries. Such modelling permits not only estimation of the size of the resources to be regulated and the distribution, but also study of the changes over time and space in the ecosystem's reaction to the desired and/or recommended level of fishing.

13. The transition to ecosystem modelling will make it possible to obtain better-founded figures for possible catch which take into account the interaction among the range of factors affecting an ecosystem's fisheries and non-fisheries components, and to exploit the living resources of the seas and oceans in accordance with their natural replenishment capacity.

14. At the same time, the use of ecosystem modelling is significantly limited by the high cost of developing such models, including organizing and maintaining the system for collection of input parameters and the system for processing

them. Obviously, in cases where living resources are exploited by a number of countries, cooperation between these countries will be needed in order to employ the ecosystem approach to the exploitation of living marine resources.